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ATSE-P

20 May 2005

MEMORANDUM THRU

Deputy Commanding General, Futures/Director, Futures Center (ATFC-ZA), United States Army Training and Doctrine Command, Bldg 133, 33 Ingalls St, Fort Monroe, Virginia 23651-5000
Headquarters, Department of the Army, Deputy Chief of Staff, G2 (DAMI-POB), 1000 Army Pentagon, Room 2E383, Washington, DC 20310-1000

FOR Military Executive (EXCOM-MX), National Geospatial-Intelligence Agency, 4600 Sangamore Rd, Bethesda, MD 20816-5003

SUBJECT: Refinement of Army Geospatial Information and Services (GI&S) Requirements-2005

1. References:

a. AR 115-11, Geospatial Information and Services, 10 December 2001.

The below referenced documents are located on TPIO-Terrain Data's web site at: http://www.wood.army.mil/TPIO-TD/.

b. Memorandum, TRADOC Program Integration Office-Terrain Data (TPIO-TD), Army Digital Topographic Data Requirements, 14 Jun 00.

c. Memorandum, TRADOC Program Integration Office-Terrain Data (TPIO-TD), Army Digital Topographic Data Requirements, 18 Feb 98.

2. AR 115-11 defines Army policy and procedures for Geospatial Information and Services (GI&S) issues. This requirements letter provides updates to previous Army Digital Topographic Data requirements letters dated 2000 and 1998 (references b and c). Enclosure 1 provides an updated summary of the Army's GI&S requirements. The intent of this document is to update and clarify the Army's GI&S requirements.

3. Recent planned geospatial transitions, as well as changes from the events of 9.11 and the Global War on Terror, have moved NGA to provide more rapidly built custom products as well as some limited finished standard products as part of the NGA Geospatial Transition Plan. However, there is a concern in the Army that geospatial production within NGA is languishing under the assumption that geospatial-intelligence should be the priority data, rather than finished products and datasets that are delivered to our troops. Service and Army Components of

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Combatant Command level GI&S officers have to fight hard, through the NGA Support Teams, to get standard products produced for the warfighter, especially for training and exercise events prior to deployment into theater. Standard products (e.g., TLM's, City Graphics) constitute the digital infrastructure that the Army depends upon for safety of navigation on the ground. Additionally, we look forward to sharing data produced by Army units in the field for value adding and archiving at NGA.

4. I want to thank NGA for setting up recent test cases to work these types of issues. The Geospatial Intelligence Project-Korea (GIP-K) and the GEOINT Standards Working Group (GWG) are excellent examples of working forums that will directly benefit the warfighter and influence the future of geospatial data through the vetting of new processes, procedures, and standards. We support NGA efforts and initiatives and look forward to helping define the best mix of products through experimentation and field support.

5. Point of contact for this action is COL David Kingston, Director, TRADOC Program Integration Office-Terrain Data, email: david.kingston@us.army.mil; telephone: 573-329-1908.

Encl

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Army Geospatial Information Requirements

1. The following are the Army's geospatial information requirements:

a. Foundation Based Operations: The Army requires that NGA demonstrate the business case for foundation-based operations, covering everything from the customer's requirements statement to the delivery of a finished product or data set.

1. Requirements System. The Army requires a robust, modernized and streamlined requirements system for inputting and tracking geospatial information requirements. This system must support existing products, emerging products (views) and requests for specific information and must be accessible at all classification levels.

2. Data Model/Data Element Dictionary. The Army requires NGA to lead the way in defining and supporting a DoD data model/dictionary that maximizes data interchange and reuse and that supports tactical level operations, resulting in a comprehensive data model/data element dictionary that incorporates critical features, attributes, enumeration, functionality and relationships. This data model/dictionary must support Joint, Coalition, and commercial data interchange, to insure compatibility, compliance, and interoperability with current and future battle command systems. NGA must incorporate this data model/dictionary to CADD (i.e. facilities) information and other similar data models, as well as be quickly and easily expansible to support inclusion of new types of geospatial information.

3. Data Generation. NGA must demonstrate the ability to provide mission specific data, in accordance with the NSG ORD, rapidly enough to support the warfighter. It is critical to the Army that NGA capture production metrics, bottlenecks and other issues. This information, in addition to being used by NGA to identify areas for investment (technologies, processes, methodologies and manpower), will provide the Army with an important benchmark for definition of the geospatial readiness and responsiveness for missions.

4. Data Access.

a. NGA must provide a standardized means to identify the content, currency, and accuracy of NGA data, whether the data is in an NGA database or is loaded onto the users' systems.

b. The Army requires full access to the information in the NGA databases at the classification level that corresponds to the user's classification requirement. This requirement should not wait on technological advances in multi-level security (MLS).

c. The Army requires access to NGA databases from all classification levels.

5. Metadata. The Army requires that sufficient metadata be populated to ensure that the user understands the lineage, content, and accuracy of the information in the NGA

databases. Ultimately, this metadata should be available at the attribute level for features. The Army expects NGA, through the standardization working group, to lead the effort to define metadata content and standards.

6. Rendering.

a. NGA must have the capability to rapidly render data, to specified standards, into a digital product or data set from the NGA database. NGA must also be able to provide a raster, vector and paper map, with appropriate generalization, feature displacement and symbolization, from the NGA database.

b. The Army requires that NGA provide a scalable cartographically legible symbology capability, to standard specifications, for digital maps in raster and vector format or displayed on paper. Initial efforts to automate the display of features (e.g., GEOSYM) have not met ground warfighter's needs. The Army needs a better automated symbology tool that will render feature data to appear as close to a map display as possible. The eChart program provides an early instance of the type of product the Army needs for digital map display, especially if this data type can become compatible with battle command systems.

c. The Army requires that Foundation Based Operations data continue to be provided via hard copy maps and digital geospatial information on hard media (i.e. DVD) to support units that have limited communications connectivity. Geospatial information provided on hard media should be "packaged" so as to minimize the number of such media required to cover the user's AOR.

d. The Army requires that maps be available at the lowest classification possible and releasable to coalition partners in advance of operations.

7. Time lines for rapid response support. Foundation-based operations must support the Future Combat Systems Brigade Combat Team threshold requirement to deploy to a crisis location as follows:

a. Required data sets include VPF Interim Terrain Data, Controlled Image Base (CIB) 1m, HRTe 3, 4, and 5, Vertical Obstruction Data (50 feet AGL), and TOD 3 Shallow Water, or equivalent products, based on foundation-based operations.

b. These products will be required over an initial footprint of 20 km by 20 km in 18 hours, expanding to 100 km by 100 km in 24 hours, and 150 km by 150 km in 12 days. The number of footprints required in a given period will be dependent on the FCS deployment plan and the nature of the operation.

c. Coverage areas will be defined by Army components of Combatant Commands or through the U.S. Department of the Army G2 in support of Army specific requirements (training, materiel development, modeling and simulation, and experimentation).

b. Elevation Data:

1. DTED. Level 2 (bare earth) - Worldwide coverage excluding those areas permanently ice or snow covered.

2. SRTM. Level 1 and 2 (reflective surface) - Worldwide coverage excluding those areas permanently ice or snow covered. NGA must fill void areas in the SRTM data with data that has a accuracy commensurate with or exceeding the surrounding data.

3. HRTe. NGA to lead the completion of the effort to define specifications for HRTe levels 3-5, for bare earth and reflective surface. Area requirements for these levels will be defined by the user.

4. Contours. Worldwide coverage, in vector format, excluding those areas permanently ice or snow covered. Contours in the NGA database should be generated from best available information. Area requirements for higher resolution, more accurate contours are directly implied in user requested products (i.e. a request for a 1:25,000 TLM requires contours as specified by that product). NGA must identify an approved NSGI contouring algorithm and procedures.

5. Datums. Elevation data referenced to Mean Sea Level for finished NGA products. The Army recognizes the need, within NGA databases, to maintain elevation data referenced to the ellipsoid. Elevation information must also be synchronized with the feature information – features cannot float or sink above or below the ground.

c. Feature Data:

1. The Army requires that NGA provide feature information in standardized formats or views (e.g., ITD, VMAP, UVMAP, etc.) to support display and analysis to include bathymetric data in littoral, inland lake/estuaries, and other hydrologic features.

2. The Army requires all natural and manmade vertical and horizontal obstructions over 150 feet (46m) Above Ground Level (AGL).

3. Include soils data as part of feature data using the Unified Soils Classification System. The Army commends NGA's current efforts to convert the World Wide Soils Database (1:1,000,000 scale) into foundation data (1:250,000 scale) and urges NGA to stay the course with this effort.

d. Mission Specific Data: As feature-based mission specific data are defined for systems and operations, the Army will require content specifications for these new data sets. These new specifications must be reviewed and approved by the Army. Emerging Army systems, such as the Army's Future Combat System, will require levels of feature information greater than that contained in the current products identified earlier in this section. Exact details of these information requirements are not known at this time, but

they will, at a minimum, include a significant subset of the information identified in Unified Profiles 3, 4 and 5.

e. Imagery Data:

1. Controlled Image Base. The Army requires worldwide coverage (all land areas except those permanently ice or snow covered) of CIB5. However, CIB should not be considered a long-term or permanent substitute for standard products used by the Army (i.e. TLM's). The Army requires 1-meter CIB or higher resolution over military installations. Classification and releasability should be UNCLAS/FOUO and releasable to all GWOT allies, to include 1m imagery.

2. Digital Point Positioning Data Base (DPPDB). Classified one-meter stereo imagery in areas defined by Army components of Combatant Commands or through the U.S. Department of the Army G2 in support of Army specific requirements (training, materiel development, modeling and simulation, and experimentation).

3. Multi-spectral Imagery (MSI) at 5 meter (or better) resolution with ephemeris and rigorous math model. The geo-referenced MSI must have an absolute horizontal positional accuracy that exceeds or is the same as that of the corresponding CIB. Landsat follow-on remote sensing satellites should ideally have the same coverage schema as the present Landsat system, with higher ground sample distance of 5m, using the same 7-band MSI spectral bandwidths as the present Landsat design. Coverage areas will be defined by Army components of Combatant Commands or through the U.S. Department of the Army G2 in support of Army specific requirements (training, materiel development, modeling and simulation, and experimentation).

4. Hyper-Spectral Imagery. NGA develop standards to provide calibrated Hyper-Spectral Imagery (HSI) for land cover analysis.

5. Motion Imagery. The Army requires development of motion imagery and associated products, to include still-image mosaics, geo-referenced video and updated image maps.

Army Geospatial Services Requirements

1. The following are the Army's geospatial services requirements:

a. Value Adding: The Army requires the ability for NGA to accept value-added data from the battlefield, other services, coalition forces, and members of the GEOINT community and integrate it into foundation data. NGA needs to provide standards and protocols to the Army with respect to format and content to capture value-added data from the field. The Army and NGA must work towards developing the standards (protocols, tactics, techniques, and procedures for enterprise GI&S solutions) by which the data collected by both NGA and the Services may be value added and shared to ensure the Soldiers and Services have the best data available. Request NGA develop a "certified co-producer"

program for federal agencies. Many U.S., DoD and Intelligence Community centers, to include the U.S. Army ERDC-Topographic Engineering Center (TEC), Geospatial Planning Cells, and Topographic Companies (exploiting embedded Tech Reps) have the ability to produce validated terrain data based upon approved formats and specifications so that any data produced would be immediately accepted into the Geospatial Knowledge Database by NGA as if produced by NGA itself, one of the co-production nations, or a contractor producing data.

b. Standards: The Army requires that NGA develop and maintain spatial accuracy and alignment standards for all geospatial data via the National Center for Geospatial Intelligence Standards program. Requirements for accuracy, currency and format will be defined within the geospatial information standards working groups hosted by NGA.

c. Libraries: The Army requires NGA to fully fund NGA libraries so that they can be effectively and efficiently used to store and manage geospatial information. NGA must fully integrate the NGA Regional Data Centers with the Army Knowledge Center (TEC) and the Army Regional Data Centers (stored on Theater Geospatial Databases) at the Army component of the Combatant Commands. The Army recommends NGA develop processes for routine updates of regional data sets each month, once initial data libraries are established and synchronized (the same data, same view), ensuring that all participants in the fight are using the same map.

d. Geospatial Analyst Support: The Army requires that NGA and Army examine agreements that define the lanes for NGA Geospatial Analyst support and develop a co-production paradigm so that the ground warfighter will have the best possible geospatial information. Previous agreements identified a "line of demarcation" that specified the echelons at which NGA would provide this support. This line was bypassed in OEF/OIF. NGA Geospatial Analysts are very helpful in the field, however they need to be linked closely with the Army terrain teams, who are responsible for building the digital terrain data infrastructure for the operational commander. The Army does not see a need to artificially limit the levels of support NGA provides, but we must define the roles support personnel play, and organizational relationships.

e. Hard Copy Maps:

1. The Army requires hard copy paper maps for the foreseeable future. The Army has a very limited print capability in the field with no significant increase in map printing capability being added.

2. The Army does not recognize "lite" maps. All NGA produced maps must meet an agreed upon standard and content specification. The currently produced TLM is already a 70-80% solution to the desired Army requirement. This requirement does not invalidate the need to sometimes provide an interim or substitute product. Scale must be appropriate to information content. Maps that are built to meet interim or substitute support for standard format products must use appropriate content, accuracy, and symbology of those product specifications.

3. The Army requires hard copy materials that are resistant to weather and operational wear (e.g. tyvek) as they will continue to be strongly desired by warfighters in tactical environments.

f. **Raster Improvement:** The Army requires an improved raster map product and compression technique that provides a cartographically legible map. The current CADRG product has serious cartographic legibility problems. Compression techniques for raster (line and image) and vector maps must be visually lossless. The Army supports NGA's effort to develop alternative compression techniques such as eChart, Mr. Sid, JPEG 2000+, etc.

g. **Vector Maps:** The Army supports the migration from a raster to a vector map, but will only migrate when the capability to visualize and use a map from feature information is ubiquitous within the Army. In addition to the information necessary to display on the map, this will require the capability to automatically generalize and perform cartographic displacement and the capability to properly symbolize and render the map display.

h. **Joint Geospatial Enterprise Service (J-GES):** The Army strongly endorses the NGA-JFCOM led initiative to provide Joint leadership to the Service geospatial community through the J-GES Joint governance board. This Joint governance board will establish standards, formats and protocols necessary for the two way data flow in an enterprise environment

i. **Geodetic and geophysical data:** The Army continues to require geodetic and geophysical data for declination angles and other applications.